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## ABDOMINAL PAIN IN CHILDREN\*

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Probably most of us were brought up on the theory, which was universally held in our young days, that abdominal pain in children, and especially in boys, was always due to greediness. To mention such a pain was sure to provoke the retort "What have you been eating?" and grown-ups would talk about green apples and unripe plums—most unjustly, we used to think. The remedy was likely to be something in the nature of castor oil, and many a boy regarded coffee with suspicion for years, because it had so often been the vehicle for the unpalatable dose. As a matter of fact, the great majority of abdominal pains in children are not due to some single indiscretion in diet at all, and the routine use of an aperient in such cases kills hundreds of children every year in this country. Nothing is more calculated to convert a mild appendicitis into a fatal one than the administration of purgatives.

For the purpose of diagnosis one may conveniently divide the cases into two groups: those with and those without diarrhoea, and, again, those under and those over the age of 5.

I shall say little about the first group—cases with diarrhoea. The great majority are, of course, suffering from some form of irritant poisoning, either chemical or bacterial, and here certainly we must include the few children who have been over-eating, or taking unsuitable articles of diet. In most cases the attack is short-lived, and is all over in a day or two: the doctor is only called in for the severer type of illness. There are, however, some child patients with abdominal pain and diarrhoea whose ailment is more serious, such as tuberculous peritonitis, chronic diarrhoea of children, and pneumococcal peritonitis. In tuberculous peritonitis with diarrhoea there will probably be the wasted child, the swollen, tumid abdomen, and slight, irregular fever. I shall return to pneumococcal peritonitis later.

It remains to consider cases without diarrhoea, first in children under 5 years old and then in those over this age.

### Abdominal Pain under 5 Years of Age

It is not in my province to say anything about the abdominal pains of infants who take unkindly to bottle feeding, nor shall I recount again the well-known symptoms of congenital stenosis of the pylorus. Under the age of 5 appendicitis, if not an impossible diagnosis, is distinctly uncommon, although it may be that I have the honour, such as it is, of holding the record for

operating for appendicitis at the extremes of life—my youngest patient was aged 12 days and my oldest 84 years. Both did well, although it is only fair to confess that the infant had not a normal appendicitis, the appendix lying in a hernial sac, in which, however, it had become acutely inflamed.

### INTUSSUSCEPTION

The most important condition to be borne in mind when a child under 5 gets an acute attack of abdominal pain is, of course, intussusception, because twenty-four hours' delay in making a diagnosis means death. If a child has passed undeniable blood and mucus a mistake would scarcely arise, but this symptom may be delayed for many hours, or the mother may give a confused history, and may have thrown away the evidence. Even apart from the passage of blood and mucus a diagnosis can generally be made.

I was called the other day to see a child aged 2. He had been perfectly well until 8.30 a.m., when he awoke screaming with pain in the abdomen. Seeing him with the doctor about 10.30 a.m., one was immediately struck with the attitude of the child; he lay pallid, listless, and quiet, with the imprint of fear upon his face, waiting in terror for the next pain. In a few minutes it came. He drew up his knees, groaned, and cried, and was evidently suffering severely. In about a minute the spasm passed and he became listless again. In this case the attacks of colic were about every twenty minutes, no blood or mucus was passed, and nothing could be felt in the abdomen. One and a half hours later, when he had been moved to a nursing home, the characteristic sausage-shaped tumour had become palpable, and at operation an intussusception was discovered.

One has to bear in mind that in nearly 50 per cent. of cases of intussusception the sausage-shaped tumour is absent (although under an anaesthetic it can nearly always be discovered), and it may be well worth while in cases of doubt to give an anaesthetic and palpate for it. The *signe de Dance*—that is, emptiness of the right iliac fossa—is helpful, but seldom sufficiently conclusive to enable one to diagnose on it. The signs *par excellence* of intussusception, when no blood or mucus has been passed and no tumour can be felt, are the highly suggestive alternations of listlessness and colicky pain, and the finding of blood and mucus on the examining finger per rectum.

### COLIC AND OTHER CONDITIONS

It occasionally happens that instead of missing a case of genuine intussusception the practitioner or the surgeon diagnoses it when it is not present, and this may lead to an unnecessary operation. Colic with a free discharge

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of pure mucus, without blood, is not enough, and may be due to colitis; I have seen some fruitless operating as a result of this mistake. Children are not infrequently referred to the surgeon on suspicion of intussusception who are, as a matter of fact, suffering from acute ileocolitis. They may have colicky pains and look very ill; they sometimes pass blood and mucus. Of course there is no sausage-shaped tumour to be felt, but this is not uncommon with genuine intussusception. To guard against mistakes one should note that the child is usually a little older—over 18 months, not under—and the illness usually begins with diarrhoea. The main clue, however, is to remember that ileocolitis is essentially a diarrhoea, whereas intussusception is essentially an intestinal obstruction. In the former case there is faecal matter on the examining finger per rectum as well as blood and mucus; in the latter case there is pure blood and mucus.

According to the books Henoch's purpura may mimic intussusception very closely—a very sick child, colic, a lump, and the passage of blood and mucus. I have never seen a case that gave any real difficulty. Purpuric spots on the skin give the clue.

Acute intestinal obstruction may occur in young children from causes other than intussusception, but with the exception of strangulated hernia, and obstruction following operations, it is rare.

#### Abdominal Pain over 5 Years of Age

After the age of 5 every child with an abdominal pain lasting more than an hour or two, and not accompanied by diarrhoea, is likely to be suspected, however unjustly, of appendicitis. I have had a considerable experience of cases of this type, inasmuch as for the past twenty years successive school doctors have allowed me to see *every* boy, in a large public school, suffering from abdominal pain. The great majority, needless to say, were not appendicitis, and did not need operation.

#### APPENDICITIS

Let us consider, first, the genuine cases of appendicitis. In most of these there was never any doubt or difficulty in making a diagnosis after about six hours from the onset of the symptoms. Pain as the first symptom, followed by vomiting and rise of temperature, starting in the middle of the abdomen and settling down in the right iliac fossa, with a little tenderness and guarding, assembles an unmistakable picture, though in these early cases one must be prepared to make a diagnosis with only a little tenderness and no guarding. But things are not always so simple.

There was a boy in whom the pain and tenderness were so high up that for a couple of days it was called "duodenitis." (Probably there is no such disease in children of school age.) When at length operation was performed, a high-situated appendix had perforated, and convalescence was somewhat stormy.

More serious is the confusion caused by the pelvic appendix, both in children and in adults. The great majority of missed and fatal cases of appendicitis belong to this category. There is mid-abdominal pain at the onset, and often vomiting; the pulse and temperature then rise, and the pain shifts lower in the abdomen, but there is no tenderness and no guarding in the right iliac fossa, and the practitioner, relying too much on books and too little on experience, concludes that it cannot be appendicitis. As a matter of fact it often is. If the appendix lies low in the pelvis there will be tenderness per rectum; more frequently the appendix lies a little higher, hanging over the brim, and this sign fails. There will be a little tenderness, not pronounced, on pressing above the pubes and Poupert's ligament on both sides, and that is all. But in a school

child it is quite enough to warrant a most necessary operation. After all, what else can it be besides appendicitis? There are, of course, a number of special signs described for appendicitis—skin tenderness, Rovsing's, Bastedo's, and Zachary Cope's signs, and the unilateral cremasteric reflex—but in my experience they fail us just when we should value them most.

A good many children and young people get a succession of attacks of mid-abdominal pain lasting a few hours, with no rise of pulse or temperature and no signs in the right iliac fossa, which cannot possibly be diagnosed, but which are eventually proved to be appendicitis by the development, months or years later, of a typical acute attack. The inflamed appendix is then removed, and shows a stricture left by former inflammation; thereafter, the attacks of pain cease to occur. A public school doctor sees a number of cases of this type. It is not suggested, however, that they ought to be operated on without diagnosis.

Before leaving the subject of appendicitis in schools, it may be worth while to add that in a series of about seventy cases there was no mortality, and the only one that caused grave anxiety was a boy who developed a measles rash on the third day, and was hustled into an attack of pneumonia by the anaesthetic. This promptly resolved when the rash came out, but for a day things looked very ugly. The anaesthetist unfortunately got it into his head that the boy had eaten some illicit grapes just before the operation, and must have inhaled a vomited grape-skin into the bronchus. He was unduly depressed in consequence. Under such circumstances the measles rash was a relief!

#### PNEUMOCOCCAL PERITONITIS

There is one really dangerous disease, almost confined to girls of school age, which is often mistaken for appendicitis—namely, pneumococcal peritonitis. It is not common, but most doctors will see a case or two whilst they are in practice. Sometimes it comes on with, or follows, pneumonia; the diagnosis is not then difficult. More commonly the acute type of pneumococcal peritonitis is abdominal from the first; the pain may be right-sided, in the hypochondrium or all over the abdomen, and in some cases it is very severe, more so than in any other acute abdominal condition in children. There is often a little diarrhoea for the first few hours, a very tell-tale symptom. The pulse and temperature rise, and within a day there is, as a rule, rigidity and tenderness all over the abdomen. Vomiting may or may not occur. The patient soon comes to look very ill.

In a typical case the diagnosis can be made with fair certainty; the early onset of symptoms of general peritonitis without any localization in the right iliac fossa, the early diarrhoea, and the obvious severity of the illness are enough. There may, in addition, be early signs of pneumonia. It is important to recognize the condition, principally in order that a too favourable prognosis may not be given. These children mostly die, and operation is probably worse than useless, except in later cases with a localized abscess. Many of them have been submitted to laparotomy in the past on the supposition that it was a case of appendix peritonitis. [My own practice is to refrain from immediate operation, and to institute the Ochsner-Sherren line of treatment for children with evidence of so-called "general" peritonitis due to a perforated appendix; it is astonishing how wonderfully the majority of them improve within twenty-four or forty-eight hours. Children with appendicitis not yet perforated, or only recently perforated and localized to the right iliac fossa or pelvis, should be operated on at once.]

Pneumococcal peritonitis is not the same thing, of course, as basal pneumonia simulating appendicitis, a mimicry which occurs both in children and in adults, and can lead to a grievous mistake. If there are frank signs

of pneumonia in the lung the difficulty is not likely to arise, but a child may complain of pain and tenderness in the right abdomen, look ill, and show a rise of pulse and temperature, and muscular rigidity, making up a picture perilously like that of appendicitis. Some point or other will nearly always put us on our guard. The temperature may be too high and the pulse not high enough (a temperature of 102° F. and a pulse of 90 suggests pneumonia; a temperature of 99.5° and a pulse of 100 suggests appendicitis). There may be a short, sharp, suppressed cough, the alae nasi may be working laboriously, and the stethoscope may detect fine hair crepitations at the right base. Most important of all, the respiration rate may be raised unduly—perhaps to 35, or even 40. If in doubt one should wait twenty-four hours, when in all probability the diagnosis will have clarified considerably. It is better to leave an inflamed appendix than to give ether to an early pneumonia.

*Influenza* sometimes shows a transient mimicry of appendicitis; there may be pain and tenderness in the right lower abdomen, with fever. But the rise of temperature will have preceded the pain, and will be too high in proportion to the abdominal symptoms. An enema generally puts an end to the doubt by relieving the influenza patient of his flatus and of his pain.

#### INFLAMED MESENTERIC GLANDS

In my experience, however, none of the above conditions often give rise to trouble in the differential diagnosis of acute febrile appendicitis. The real source of difficulty is inflamed mesenteric glands in the angle between the terminal ileum and the ascending colon, usually, but not always, tuberculous. Unless the surgeon is in the habit of using a Battle instead of a McBurney incision, he will greatly underestimate the frequency and importance of this condition. I have found that in 6 per cent. of cases diagnosed as acute appendicitis in school children the condition is, in fact, that of mesenteric lymphadenitis.

The pain, rise of pulse and temperature, and tenderness in the right iliac fossa are just the same, and sometimes a differential diagnosis is impossible. The gland cases do not usually vomit, the pain starts in the lower right abdomen and not at the umbilicus, and the tenderness is rather vague and diffuse; otherwise there is nothing to separate the two diseases. Nor does it much matter, except that it is wise to mention to the parents the possibility of lymphadenitis as well as appendicitis before operation. The proper treatment is to remove the appendix, then look for enlarged glands; if found they should be removed. One has to exercise care to do this, or there may be a good deal of bleeding and some risk to the integrity of the arterial blood supply to the caecum, but if the glands are left pain will recur, and if they are removed it will not.

Tuberculous mesenteric glands may, of course, be found in other parts of the abdomen besides the right iliac fossa, and may give rise to attacks of pain, fever, and tenderness. There is not much to be gained by operating under these circumstances, as the glands are likely to be too widespread for removal.

So far we have been considering the acute case with pain and fever. As everyone knows, both appendicitis and mesenteric lymphadenitis may give rise to pain and tenderness in the right iliac fossa without any fever. If the pain is severe and colicky, with vomiting, the case is probably one of obstructed appendix, and operation ought not to be delayed; if the symptoms are mild, with a steady, dull ache, no vomiting, and no rise either of pulse or temperature, it is safe to wait for a few days if the child is under close observation. If there have been previous attacks, however, it is better to remove the appendix to prevent a succession of recurrences.

#### ABDOMINAL TUBERCULOSIS, SPINAL DISEASE, MUSCULAR STRAIN

There remain a considerable number of cases in children in which the appendix cannot reasonably be suspected. There is no dietetic indiscretion, and no vomiting, diarrhoea, or abnormal constipation, though they complain of very persistent or recurrent pain. If the pain is present all day and every day it may be due to tuberculous peritonitis, tuberculous spine, or muscular strain of the abdominal wall. Tuberculous peritonitis in children can usually be recognized by one or other of the following aphorisms:

Chronic causeless ascites in a child = tuberculous peritonitis—ascitic type.

Strange lumps in a child's belly = tuberculous peritonitis—adhesive type.

A wasted child with a swollen, doughy abdomen = tuberculous peritonitis—ulcerative type.

It is very humiliating for a doctor to have under his care a patient with a perpetual pain round the abdomen, and after blaming in succession the appendix, the stomach, and the gall-bladder, eventually to be shown by someone else that there is an angular curvature of the spine which he had never looked for.

Chronic muscular strain of the abdominal muscles may be puzzling. The patient may think that his stomach or appendix is at fault, but the pain depends more on movements and posture than on taking food; there is no nausea, and there may be tenderness on pressure when, on being asked to sit up in bed, his muscles are contracted, as well as when they are relaxed. If it had been appendicular tenderness the tense muscles would have protected against it.

#### "MY PAIN"

There remains to be discussed the case of the child who complains of a recurrent pain, lasting a few minutes as a rule (though it may be longer), and mostly mid-abdominal; it comes on without any obvious cause, and a physical examination of the patient gives entirely negative results. It may recur over many months or years, and becomes so familiar that the child and the family refer to it as "my pain." Many, if not all, of these children are afflicted with mesenteric lymphadenitis, usually tuberculous, which is a very common finding at necropsies.

One used to be at a loss to understand how such enlarged glands, even if caseous or calcareous, could cause such a sudden, brief, occasional pain. This problem was solved when my friend Dr. Kiss, now professor of anatomy at Budapest, showed that the splanchnic nerve fibres of the mesentery actually traverse the lymphatic glands. A wave of peristalsis, which would be painless in itself, pulls upon the subjacent mesentery, and the inflamed or calcareous gland between its leaves irritates the nerve fibres passing through or close by; when the wave passes the pain ceases. Sometimes these children have signs of tuberculosis elsewhere, as in the glands of the neck. Occasionally a skiagram shows calcareous glands in the abdomen.

The condition is difficult to treat. If the pains are frequent, rest in bed in fresh air, and regular dosing with belladonna, generally relieves. If there are days or weeks between the spasms it is scarcely worth doing anything. In the course of a few years the children seem to grow out of it. Operation might be considered, but one is apt to find the glands too numerous to be removed.

Enough has been said, I trust, to demonstrate that we have now got beyond the stage of accusing every boy or girl with a pain of having eaten something wrong, and that we no longer give aperients till we know for certain what we are dealing with.